CLAIMS

1. Air treatment device comprising:
- a housing comprising an air inlet and an air outlet;
- a fan for stimulating an airflow through the housing from the air inlet to the air outlet;
- a UV treatment chamber downstream relative to said air inlet, the UV treatment chamber comprising at least one UV radiation source for exposing said airflow to UV radiation for killing a microorganism present in said airflow.

2. Air treatment device according to claim 1, further comprising at least one filter upstream relative to the UV treatment chamber for removing particles and microorganisms having a size larger than a predetermined filter diameter from said airflow before exposing said airflow to said UV radiation.

3. Air treatment device according to claim 2, the air treatment device comprising:
- a dust filter downstream relative to the air inlet for removing large dust particles from said airflow; and
- a HEPA filter downstream relative to the dust filter for removing small dust particles and large microorganisms from the airflow.

4. Air treatment device according to claim 2, the air treatment device comprising a carbon filter downstream relative to the air inlet for removing dust particles and microorganisms from said airflow.

5. Air treatment device according to claim 2, wherein a filter UV radiation source is provided for irradiating UV radiation on at least one of said at least one filter.

6. Air treatment device according to claim 1, wherein the fan is positioned upstream relative to the UV treatment chamber such that the airflow in the UV treatment chamber is substantially turbulent.

7. Air treatment device according to claim 2, further comprising a cooling unit downstream relative to said at least one filter for cooling, and dehydrating by cooling, the airflow.

8. Air treatment device according to claim 7, wherein a humidity sensor is disposed downstream relative to the cooling unit, and a

processing device receives humidity data from said humidity sensor, the processing device controlling the cooling unit to provide a predetermined humidity in the UV treatment chamber.

9. Air treatment device according to claim 8, wherein the humidity sensor is disposed in the UV treatment chamber.

10. Air treatment device according to any of claims 7 - 9, wherein a first temperature sensor is disposed downstream relative to the cooling unit, and a processing device receives first temperature data from said first temperature sensor, the processing device controlling the airflow rate by controlling a fan speed, to provide a predetermined temperature of the air leaving the UV treatment chamber.

11. Air treatment device according to claim 10, wherein the temperature sensor is disposed immediately downstream to the UV treatment chamber.

12. Air treatment device according to any of the preceding claims, further comprising an ionizer, downstream relative to said at least one filter for providing an electron stream substantially perpendicular to the direction of airflow.

13. Air treatment device according to any of claims 7 - 11, further comprising an ionizer, downstream relative to the cooling unit for providing an electron stream substantially perpendicular to the direction of airflow.

14. Air treatment device according to any of the preceding claims, further comprising a second carbon filter downstream relative to said at least one filter.

15. Air treatment device according to any of claims 7 - 11, further comprising a second carbon filter downstream relative to said at least one filter, the carbon filter and the cooling unit being combined in one unit.

16. Air treatment device according to any of the preceding claims, wherein an inner wall of the UV treatment chamber is provided with a UV radiation reflecting layer.

17. Air treatment device according to claim 16, wherein the reflecting layer consists of aluminum.

18. Air treatment device according to claim 16 or 17, wherein the reflecting layer has a rough surface such that reflected UV radiation is scattered.
19. Air treatment device according to any of claims 16 - 18, wherein the reflecting layer is formed by sputtered aluminum.
20. Air treatment device according any of the preceding claims, wherein the second UV radiation source is provided with a second temperature sensor and a processing device receiving second temperature data from said second temperature sensor, said processing device controlling a power output of said at least one UV radiation source for protecting the at least one UV radiation source from undercooling or overheating.
21. Air treatment device according to any of the preceding claims, further comprising at least one microorganism sensor for determining a number of microorganisms present in the air passing said microorganism sensor.
22. Air treatment device according to claim 21, wherein said microorganism sensor is connected to a processing device, the processing device controlling the air treatment device in response to the determined number of microorganisms.
23. Air treatment device according to claim 21 or 22, a first microorganism sensor being provided immediately downstream of the air inlet and a second microorganism sensor being provided immediately upstream to the air outlet, said first and said second microorganism sensors being connected to a processing device, the processing device determining a sterilization factor from a determined number of microorganisms present in the air flowing into the air treatment device and a determined number of microorganisms present in the air flowing out of the air treatment device.
24. Air treatment device according to any of the preceding claims, wherein the at least one UV radiation source is disposed in a cover, which cover is transmissive for the emitted UV radiation.
25. Air treatment device according to claim 24, wherein the cover is made of Teflon.
26. Air treatment device according to any of the preceding claims, wherein the air inlet and the air outlet in the housing are

constructed such, that no UV radiation may escape from the housing.

27. Air treatment device according to any of the preceding claims, wherein an UV radiation absorbing layer is provided on a wall of the housing.

28. Air treatment device according to any of the preceding claims, wherein the emitted UV radiation of said at least one UV radiation source has a wavelength between 253 nm and 257 nm, in particular a wavelength of 253.7 nm.

29. Air treatment device according to claim 5, wherein the emitted UV radiation of the filter UV radiation source has a wavelength between 253 nm and 257 nm, in particular a wavelength of 253.7 nm.

30. Air conditioning system comprising an air treatment device, the air treatment device comprising:

- a housing comprising an air inlet and an air outlet;
- a fan for stimulating an airflow through the housing from the air inlet to the air outlet;
- a dust filter downstream relative to the air inlet for removing large dust particles from said airflow;
- a HEPA filter downstream relative to the dust filter for removing small dust particles and large microorganisms from the airflow;
- a first UV radiation source for irradiating UV radiation on the HEPA filter; and
- an UV treatment chamber downstream relative to said HEPA filter, the UV treatment chamber comprising a second UV radiation source for irradiating UV radiation in said UV treatment chamber.

31. Air treatment method comprising:

- generating an airflow; and
- radiating UV radiation for exposing said airflow to said UV radiation for killing a microorganism present in said airflow.

32. Air treatment method according to claim 31, the method further comprising filtering particles and microorganisms having a size larger than a predetermined filter diameter from said airflow before exposing said airflow to said UV radiation.

33. Air treatment method according to claim 31 or 32, the method further comprising dehydrating the airflow before exposing said airflow to said UV radiation.

34. Air treatment method according to any of claims 31 - 33, the method further comprising:

- determining an air temperature of said airflow; and
- controlling an airflow rate in response to said air temperature.

35. Air treatment method according to any of claims 31 - 34, the method further comprising generating an electron stream in said airflow, the electron stream being substantially perpendicular to the direction of said airflow.

36. Air treatment method according to any of claims 31 - 35, the method further comprising:

- determining a temperature of a UV radiation source;
- controlling a power consumption of said UV radiation source for protecting said UV radiation source against overheating or undercooling.

37. Air treatment method according to any of claims 31 - 36, the method further comprising:

- determining a number of microorganisms present in said airflow; and
- controlling at least one of an airflow rate, hydration level and a radiation source power consumption in response to the determined number of microorganisms.

38. Air treatment method according to claim 37, the method comprising:

- determining an input number of microorganisms present in said airflow before exposing said airflow to said UV radiation;
- determining an output number of microorganisms present in said airflow after exposing said airflow to said UV radiation; and
- determining a sterilization factor from said input number of microorganisms and said output number of microorganisms;

wherein said at least one of an airflow rate, hydration level and a radiation source power consumption is controlled in response to said sterilization factor.